Appendix B

Summary of Mitigation Measures, Best Management Practices (BMPs), Guidelines, Standards and Standard Operating Procedures (SOPs)

INTRODUCTION

The following Mitigation Measures and Conservation Actions are a compilation of Best Management Practices (BMPs), Standards, and/or operating procedures used by the BLM to meet statutory requirements for environmental protection and comply with resource specific Goals and Objectives set forward in this land use plan. The BLM will apply mitigation measures and conservation actions to modify the operations of authorized lands uses or activities to meet these obligations. Additional direction regarding mitigation can be found in the Interim Policy, Draft - Regional Mitigation Manual Section - 1794 (IM 2013-142) or subsequent decision documents. Required Design Features for sage-grouse are detailed in a separate Appendix (Appendix V-1).

These measures and actions will be applied to avoid, minimize, rectify, reduce, and compensate for impacts if an evaluation of the authorization area indicates the presence of resources of concern which include, but are not limited to air, water, soils, cultural resources, national historic trails, recreation values and important wildlife habitat in order to reduce impacts associated with authorized land uses or activities such as road, pipeline, or power line construction, fluid and solid mineral development, range improvements, and recreational activities. The mitigation measures and conservation actions for authorizations will be identified as part of the National Environmental Policy Act (NEPA) process, through interdisciplinary analysis involving resource specialists, project proponents, government entities, landowners or other Surface Management Agencies. Those measures selected for implementation will be identified in the Record of Decision (ROD) or Decision Record (DR) for those authorizations and will inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands and minerals to mitigate impacts from those authorizations. Because these actions create a clear obligation for the BLM to ensure any proposed mitigation action adopted in the environmental review process is performed, there is assurance that mitigation will lead to a reduction of environmental impacts in the implementation stage and include binding mechanisms for enforcement (CEQ Memorandum for Heads of Federal Departments and Agencies 2011).

Because of site-specific circumstances and localized resource conditions, some mitigation measures and conservation actions may not apply to some or all activities (e.g., a resource or conflict is not present on a given site) and/or may require slight variations from what is described in this appendix. The BLM may add additional measures as deemed necessary through the environmental analysis and as developed through coordination with other federal, state, and local regulatory and resource agencies. Application of mitigation measures and conservation actions is subject to valid existing rights, technical and economic feasibility.

Implementation and effectiveness of mitigation measures and conservation actions would be monitored to determine whether the practices are achieving resource objectives and accomplishing desired goals. Timely adjustments would be made as necessary to meet the resource goals and objectives.

The list included in this appendix is not limiting, but references the most frequently used sources. The BLM may add additional site-specific restrictions as deemed necessary by further environmental analysis and as developed through coordination with other federal, state, and local regulatory and resource agencies. Because mitigation measures and conservation actions change or are modified, based on new information, the guidelines will be updated periodically. As new publications are developed; the BLM may use updated BMPs. In addition, many BLM handbooks (such as BLM Manual 9113-Roads and 9213-Interagency Standards for Fire and Aviation Operation) also contain BMP-type measures for minimizing impacts. These BLM-specific guidance and direction documents are not referenced in this appendix. The EIS for this RMP does not decide or dictate the exact wording or inclusion of these mitigation measures and conservation actions. Rather, they are used in the RMP and EIS process as a tool to help demonstrate at the Land Use Plan scale how they will be applied in considering subsequent activity plans and site-specific authorizations. These

mitigation measures and conservation actions and their wording are matters of policy. As such, specific wording is subject to change, primarily through administrative review, not through the RMP and EIS process. Any further changes that may be made in the continuing refinement of these mitigation measures and conservation actions and any development of program-specific standard procedures will be handled in another forum, including appropriate public involvement and input.

Within the limits of BLM's authority, specific BMPs or guidelines may be required as a condition of an authorization at the project level (implementation level) to address site- specific circumstances. The use of other BMPs and guidelines would be analyzed on a case-by-case basis during environmental review associated with projects on the BLM land.

Required design features (RDF) to limit impacts to sage-grouse are addressed in Appendix V-1.

Within the limits of BLM's authority, specific BMPs or guidelines may be required as a condition of an authorization at the project level (implementation level) to address site- specific circumstances. The use of other BMPs and guidelines would be analyzed on a case-by-case basis during environmental review associated with projects on the BLM land. BMPs and guidelines are not a "one size fits all approach" that address all specific circumstances that may occur. On occasion, an individual practice or guideline in this appendix may not be identical to actions outlined in the alternatives. In cases where differences are noted, the action outlined in the alternative that is selected would take preference over the general practice or approach that is described in the BMPs and Guidelines section of the RMP.

The following practices would be applied as appropriate, regardless of the alternative chosen: Note that additional details about Mitigation, Reclamation, and Soil Guidelines can be found in Appendix C (SD Mitigation Guidelines), Appendix D (SD Reclamation Guidelines) and in Appendix N (Soil Monitoring) and Appendix V-1 (RDF for Sage Grouse).

I. Air Resources BMPs
II. Climate Change BMPs
III. Other BMPs, Guidelines, Standards, and SOPs
    - Air Quality Guidelines for Open Burning
    - Air Resources BMPs for Fluid Minerals
    - Aquatic Nuisance Species (ANS) Management Plan, South Dakota
    - Bats and Wind Energy
    - Communication Towers: Service Guidance on Siting, Construction, Operation and Decommissioning
    - Core Terrestrial Indicators and Methods, BLM
    - Field Office Technical Guides, USDA Natural Resources Conservation Service (NRCS)
    - Fluid Minerals Operations – Reducing Preventable Causes of Direct Wildlife Mortality
    - Forestry Best Management Practices for South Dakota
    - Guidelines for Livestock Grazing Management, Montana/Dakotas (Dakotas Portion)
    - Integrated Vegetation Management Handbook
    - Interagency Burned Area Rehabilitation Guidebook
    - Interagency Standards for Fire and Fire Aviation Operations
    - Interpreting Indicators of Rangeland Health
    - Invasive Species National Management Plan 2008-2012
    - Keep Aquatic Nuisance Species out of South Dakota Waters
    - Land-Based Wind Energy Guidelines, U.S. Fish and Wildlife Service
    - Management of Land Boundary Plans
    - Mitigation Guidelines, South Dakota Field Office
    - Monitoring Guidelines for Soils
    - National Management Measures to Control Nonpoint Source Pollution from Agriculture
    - National Range and Pasture Handbook
    - Reclamation Guidelines, South Dakota
    - Renewable Energy Facilities on BLM-Administered Lands: Best Management Practices for Reducing Visual Impact
    - Riparian Area Management: Grazing Management Processes and Strategies for Riparian-Wetland Areas

- Selected Practices for Avian Protection on Power Lines
- Siting Guidelines for Wind Power Projects in South Dakota
- Standards for Federal Lands Boundary Evidence, 600 DM 5
- Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development
- Upland Soil Erosion Monitoring and Assessment: An Overview
- Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States
- Wind Energy Development Programmatic EIS

I. Air Resources BMPs

Developed by: Bureau of Land Management

Year developed or last updated: 2012

Impacts to air resources and air quality related values (AQRVs) can be reduced using the following BMPs:

A. Fugitive dust emissions can be reduced by:

1. using two-track primitive roads whenever possible rather than developing a dirt road;
2. applying water or chemical suppressants (e.g., magnesium chloride, calcium chloride, lignin, sulfonate, or asphalt emulsion) to non-primitive unpaved roads or surfacing non-primitive unpaved roads with gravel, chip-seal, or asphalt;
3. imposing vehicle speed limits on unpaved roads;
4. restricting the extent of surface impacts during construction activities and ongoing operations by using directional drilling to reduce the number of oil and gas well pads when feasible;
5. using dust abatement techniques before, during, and after surface clearing and excavation activities;
6. covering construction materials and stockpiled soils if they are a source of fugitive dust;
7. suspending construction activities during high winds;
8. adding gravel to non-reclaimed well pad areas;
9. revegetating areas when construction is complete;
10. locating linear facilities in the same or parallel trenches and constructing them at the same time; and
11. mowing rather than removing vegetation.

B. Fugitive dust and vehicle exhaust emissions related to oil and gas activity can be reduced by restricting vehicle trips by:

1. consolidating facilities by using directional drilling and multiwell oil and gas pads;
2. developing centralized liquid collection (water, produced water, and fracturing liquid) facilities and production (treatment and product storage) facilities to reduce the number and average distance of vehicle trips;
3. using shuttles or vanpools for employee commuting;
4. using automated equipment and remote telemetry; and
5. using solar power to add automated equipment in areas without access to electricity.

C. Non-vehicular engine exhaust emissions can be reduced by:

1. electrifying equipment when feasible;
2. using natural gas or electric engines rather than diesel engines;
3. using alternative energy (solar power, wind power, or both) to power new water source developments; and
4. converting power sources at existing water well developments to alternative energy sources.

D. Fugitive volatile organic compound (VOC), hazardous air pollutant (HAP), and/or methane (a greenhouse gas [GHG]) emissions from oil and gas activities can be reduced by the following BMPs when feasible:

1. using green completion technology to capture methane (and some VOC and HAP) emissions during completion and place the gas in sales pipelines;
2. using flaring rather than venting during completion activities, but only in cases where product capture is not feasible;
3. using closed tanks rather than open tanks or pits;
4. installing vapor recovery units on condensate, produced water, and oil storage tanks;
5. using vapor balancing during condensate and oil tanker truck loading;
6. using closed-loop drilling;
7. replacing pneumatic (natural gas) pumps with electric or solar pumps;
8. optimizing glycol circulation rates on glycol dehydrators;
9. replacing wet seals with dry seals in centrifugal compressors;
10. replacing worn rod packing in reciprocating compressors;
11. installing automated plunger lift systems in natural gas wells; and
12. monitoring equipment leaks and repairing equipment leaks.

E. Sulfur dioxide (SO2) emissions would be reduced by:

1. using ultra-low sulfur diesel fuel in diesel vehicle and stationary engines.

II. Climate Change BMPs

Impacts to climate change can be reduced using the following BMPs:

A. Reduce CO_2 emissions by reducing vehicle miles traveled and using fuel-efficient vehicles.
B. Reduce CO_2 emissions by using renewable energy to power equipment.
C. Reduce CO_2 emissions by using energy saving techniques.
D. Identify and implement methods to sequester CO_2.
E. Reduce methane emissions from oil and gas activities by:

1. capturing methane using green completion, when feasible, and beneficially using the gas by placing it in sales pipeline;
2. flaring methane during well completion activities for which green completion is infeasible;
3. replacing natural gas driven pneumatic equipment with solar or electrically powered equipment;
4. optimizing glycol recirculation rates for glycol dehydrators;
5. operating flash tank separators on glycol dehydrators; identifying fugitive emissions from equipment leaks and repairing or replacing seals, valves, compressor rod packing systems, and pneumatic devices; and
6. implementing additional GHG emission reduction strategies identified in the oil and gas BMPs located at EPA Natural Gas STAR Program, http://www.epa.gov/gasstar/tools/recommended.html

III. Other BMPs, Guidelines, Standards, and SOPs

The following BMPs are described in detail elsewhere in this document or published separately. A summary and description of each is provided here:

- **Air Quality Guidelines for Open Burning**
  Source: State of South Dakota
  Online at: http://denr.sd.gov/des/aq/openburn.aspx
  Developed/Updated: 2010
  Activities Affected: Air Quality, Recreation, prescribed fire.
  Description: Provides guidelines to follow when open burning. Guidelines address visibility and smoke dispersion, hazardous waste issues, notification of other parties.

- **Air Resources BMPs for Fluid Minerals**
  Source: BLM
  Online at:
  http://www.blm.gov/style/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/bmps.Par.60203.File.dat/WO1_Air%20Resource_BMP_Slideshow%2005-09-2011.pdf
  Developed/Updated: 2011
  Activities Affected: Air Quality, Oil and Gas exploration and development.
  Description: This summary of various Air Resource BMPs outline common problems associated with fluid mineral production that can impact air quality and describes practices that reduce emissions. Examples of topics addressed include centralized water storage and delivery, centralizing of production, dust control, vehicle traffic, venting/ flaring, vapor recovery units, hatches, seals and valves. This summary also describes maintenance and monitoring practices.

  Additional information about Air Resource BMPs can be found at:
  - EPA Natural Gas STAR Program: online at http://www.epa.gov/gasstar/tools.recommended.html
  - California Air Resources Board's Clearinghouse: online at http://www.arb.ca.gov/cc/non-co2-clearinghouse/non-co2-clearinghouse.htm
  - Four Corners Air Quality Group: online at http://www.nmenv.state.nm.us/aqb/4C/

- **Aquatic Nuisance Species (ANS) Management Plan, South Dakota**
  Source: South Dakota Department of Game, Fish and Parks
  Online at: http://gfp.sd.gov/wildlife/nuisance/aquatic/SDANS-management-plan.aspx
  Developed/Updated: 2008
  Activities Affected: Recreation, invasive species control..
  Description: The development of a state ANS management plan, as called for in Section 1204 of the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA) of 1990, provides an opportunity for federal cost-share support for implementation of the plan. This management plan was developed to address the prevention, control, and effects of aquatic nuisance species that have invaded or may invade South Dakota's waters.

- **Bats and Wind Energy**
  Source: Bats and Wind Energy Cooperative in partnership with other organizations and agencies
  Online at: http://www.batsandwind.org/
  Developed/Updated: 2011
  Activities Affected: Renewable resources, wildlife
  Description: Provides research, mitigation and operating deterrents to reduce the impacts of wind farms on bats. Currently, there are three areas of research BWEC is focusing on. These themes are designed to encompass a variety of approaches to resolve the issue of bat fatalities at wind facilities:
  - Pre-construction monitoring to assess bat activity levels and use at proposed wind turbine sites.
  - Post-construction fatality searches to determine estimates of fatality, compare fatality estimates among facilities, and determine patterns of fatality in relation to weather and habitat variables.
  - Operational Mitigation and Deterrents will focus on testing the effectiveness of seasonal low wind shutdowns and deterring devices on reducing fatality of bats.

- **Communication Towers: Service Guidance on Siting, Construction, Operation and Decommissioning**
  Source: BLM
  Online at: http://www.fws.gov/habitatconservation/com_tow_guidelines.pdf
  Developed/Updated: 2014
  Activities Affected: Air Quality, recreation, renewable resources
  Description: These guidelines were developed by Service personnel from research conducted in several eastern, midwestern, and southern States, and have been refined through Regional review. They are based on the best information available at this time, and are the most prudent and effective measures for avoiding bird strikes at towers. These guidelines promote collocation and reduction of the number of towers. They also address the height of towers, use of guy wires markers, minimizing the footprint of sites, relocation of sites away from important habitat and removal of obsolete towers and other impacts of communication sites on wildlife.

- **Core Terrestrial Indicators and Methods, BLM**
  Source: BLM
  Reference: Technical Reference 440
  Online at: http://www.blm.gov/nstc/library/pdf/TN440.pdf
  Developed/Updated: 2011
  Activities Affected: Range, vegetation and soil monitoring
  Description: The BLM Assessment, Inventory, and Monitoring (AIM) Strategy was initiated, in part, to evaluate current monitoring activities and recommend procedures to improve the efficiency and effectiveness of these activities. To this end, the AIM Strategy supports an integrated approach to: (1) document the location and abundance of natural resources on public lands; (2) facilitate the description of resource conditions; and (3) identify natural resource trends or changes. This recommendation will be accomplished through the integration of fundamental processes including: (a) development and application of a consistent set of ecosystem indicators (i.e., quantitative core indicators) and consistent measurement methods; (b) development and implementation of a statistically valid sampling framework; (c) application and integration of remote sensing technologies; and (d) implementation of related data acquisition and management plans. The purpose/intent of this report is to provide an introduction to, and describe, the Core Indicators and Methods component of the AIM Strategy. Further, this report provides guidance on how to maintain consistency of effort and resources (i.e., cited materials) for further details on established protocols. This Core Indicators and Methods component identifies a small set of core indicators (i.e., measurements) that, when collected, can be used for many purposes across ecosystem types including rangeland, forest, and riparian areas. This set of core indicators, based on quantitative land cover and vegetation data using standardized measurements, will allow data to be integrated across field, district, and state office boundaries.

- **Field Office Technical Guides, USDA Natural Resources Conservation Service (NRCS)**
  Source: NRCS
  Online at: http://efotg.sc.egov.usda.gov/toc.aspx?CatID=13668
  Developed/Updated: Various dates; guides are updated periodically
  Activities Affected: Range, riparian, soils, reclamation, wildlife, recreation, weed control.
  Description: The practices and standards developed by NRCS address water quality, sediment, erosion control, streambank and shoreline protection, weed control, livestock grazing, habitat restoration and other aspects of natural resource management. With the exception of the farming practices, many of the standards and practices have applicability to BLM management and may be applied as needed to protect resources, reduce conflicts, and limit impacts associated with resource use.

- **Fluid Minerals Operations – Reducing Preventable Causes of Direct Wildlife Mortality**
  Source: BLM
  Reference: Instruction Memorandum No. 2013-033
  Online at:
  http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-033.html
  Developed/Updated: 2012
  Activities Affected: Oil and gas, wildlife
  Description: This Instruction Memorandum (IM) establishes policy for reducing preventable causes of direct wildlife mortality associated with fluid mineral facilities authorized by the Bureau of Land Management (BLM). This policy also provides for increased protection of livestock and human health and safety around fluid mineral facilities. Fluid mineral facilities include oil, gas, and geothermal facilities and associated structures authorized by the BLM through Applications for Permit to Drill (APD), Geothermal Drilling Permits (GDP), Sundry Notices, or fluid mineral associated rights-of-way.
  This IM addresses Best Management Practices (BMP) for reducing the risk of direct wildlife mortality from the following five fluid mineral practices:
  - Open Pits and Tanks Containing Freestanding Liquids;
  - Chemical Tank Secondary Containment;
  - Pit, Tank, and Trench Entrapment Hazards;
  - Exhaust Stacks; and
  - Wire Exclosure Fences for Well Pads or Production Facilities and Associated Rights-of-way.

- **Forestry Best Management Practices for South Dakota**
  Source: South Dakota Department of Agriculture
  Online at: https://sdda.sd.gov/legacydocs/Forestry/publications/PDF/Forestry-BMP.pdf
  Developed/Updated: 2003
  Activities Affected: Forestry, soils, water quality, weed control.
  Description: Describes management practices to reduce impacts from logging and other harvest practices. The BMPs address:
  - Forest watersheds and non-point source pollution
  - Road maintenance and construction
  - Timber harvest design
  - Streamside management
  - Stream crossings
  - Winter logging
  - Hazardous substances

- **Guidelines for Livestock Grazing Management, Montana/Dakotas (Dakotas Portion)**
  Source: BLM
  Reference: BLM/MT/PL-019+1020
  Online at:
  http://www.blm.gov/style/medialib/blm/mt/blm_programs/grazing.Par.70770.File.dat/DakotasSG.pdf
  Also available in this document. Refer to Appendix A.
  Developed/Updated: 1997
  Activities Affected: Range, vegetation, soils wildlife, water quality.
  Description: Guidelines for grazing management are preferred or advisable approaches to grazing management practices determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard(s).

  Guidelines are provided to maintain or improve resource conditions in upland and riparian habitats available for livestock grazing. In both riparian and upland habitats, these guidelines focus on establishment and maintenance of proper functioning condition and healthy rangelands. The application of these guidelines is dependent on individual management objectives.

- **Integrated Vegetation Management Handbook**
  Source: BLM
  Reference: H-1740-2
  Online at:
  http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_handbook.Par.59510.File.dat/H-1740-2.pdf
  Developed/Updated: 2008
  Activities Affected: Range, weeds, reclamation
  Description: The BMPs describe practices to limit impacts of vegetation treatment to:
  - Invasive plant species
  - Soil resources
  - Native plant conservation and revegetation
  - Using pesticide and biological controls
  - Air quality
  - Wildlife habitat
  - Cultural and historic resources
  - Water quality and wetlands
  - Recreation, visual, and wilderness resources

- **Interagency Burned Area Rehabilitation Guidebook**
  Source: BLM, NPS, FWS, BIA
  Reference:
  Online at: http://www.fws.gov/fire/ifcc/Esr/Policy/BAR_Guidebook11-06.pdf
  Developed/Updated: 2006

Activities Affected: Fire, reclamation, wildlife soils and vegetation
Description: The purpose of the Interagency Burned Area Rehabilitation Guidebook (Guidebook) is to provide general operational guidance for the Department of the Interior Burned Area Rehabilitation (BAR) activities after a wildfire. In conjunction with Departmental and agency policy, it is designed to provide agency administrators and BAR specialists with sufficient information to:

- Understand BAR policy, standards, and procedures.
- Assess wildfire damage and develop a cost effective plan or report.
- Assess and report accomplishments.

It consolidates and provides an interagency interpretation of BAR policies, procedures, objectives, and standards where there is Departmental and agency agreement.

- **Interagency Standards for Fire and Fire Aviation Operations**
  Source: BLM, NPS, USFWS, and USFS
  Reference: NFES 2724
  Online at: http://www.nifc.gov/PUBLICATIONS/redbook/2014/RedBookAll.pdf
  Developed/Updated: 2012
  Activities Affected: Fire, aviation, and safety
  Description: This is an interagency publication that provides guidance and policy direction for the federal fire program. Includes standards for firefighting, identifies roles of agencies, clarifies administration process, safety procedures, incident management, fire suppression, training, equipment, communications, aviation operations/resources, prescribed fire, and reviews and investigations.

- **Interpreting Indicators of Rangeland Health**
  Source:
  Reference: Technical Reference 1734-6
  Online at: http://www.blm.gov/nstc/library/pdf/1734-6rev05.pdf
  Developed/Updated: 2005
  Activities Affected: Range, soils, wildlife, and water quality.
  Description: This book describes a protocol for using 17 qualitative soil and vegetation indicators to evaluate the status of three ecosystem attributes: soil and site stability, hydrologic function, and biotic integrity. Qualitative assessments of rangeland health provide land managers and technical assistance specialists with a good communication tool for use with the public. Many of these tools have been used successfully for this purpose over the past 100 years. The technique described in this book can be used to provide early warnings of resource problems on upland rangelands. It can also be used to help identify specific resource issues (e.g., erosion or invasive species) that must be addressed and to prioritize land for management resources. Version 4 is the second published edition of this technique. The changes in Version 4 are designed to improve the consistency in the application of the process. The most significant modification was the replacement of the Ecological Reference Area Worksheet with the Reference Sheet. The Reference Sheet facilitates consistent application of the process throughout an ecological site by integrating all available sources of data and knowledge to generate a single range of reference conditions for each indicator.

- **Invasive Species National Management Plan 2008-2012**
  Source: National Invasive Species Management Council (NISC)
  Online at: http://www.invasivespecies.gov
  Developed/Updated: 2008
  Activities Affected: All activities
  Description: Directs federal efforts (including overall strategy and objectives) to prevent, control and minimize invasive species and their impacts for fiscal years 2008 through 2012.

- K**eep Aquatic Nuisance Species out of South Dakota Waters**
  Source: South Dakota Department of Game, Fish and Parks
  Online at: http://gfp.sd.gov/wildlife/nuisance/aquatic/default.aspx
  Developed/Updated: 2008
  Activities Affected: Invasive species control, recreation
  Description: Provides practices and guidelines to reduce the threat of the introduction and spread aquatic

nuisance species.

- **Land-Based Wind Energy Guidelines, U.S. Fish and Wildlife Service**
  Source: USFWS
  Reference: OMB Control No, 1018-0148
  Online at: http://www.fws.gov/windenergy/docs/WEG_final.pdf
  Developed/Updated:
  Activities Affected: Renewable energy and wildlife.
  Description: The Guidelines discuss various risks to "species of concern" from wind energy projects, including collisions with wind turbines and associated infrastructure; loss and degradation of habitat from turbines and infrastructure; fragmentation of large habitat blocks into smaller segments that may not support sensitive species; displacement and behavioral changes; and indirect effects such as increased predator populations or introduction of invasive plants. The Guidelines assist developers in identifying species of concern that may potentially be affected by their proposed project, including migratory birds; bats; bald and golden eagles and other birds of prey; prairie and sage grouse; and listed, proposed, or candidate endangered and threatened species. Wind energy development in some areas may be precluded by federal law; other areas may be inappropriate for development because they have been recognized as having high wildlife value based on their ecological rarity and intactness.

  The Guidelines use a "tiered approach" for assessing potential adverse effects to species of concern and their habitats. The tiered approach is an iterative decision-making process for collecting information in increasing detail; quantifying the possible risks of proposed wind energy projects to species of concern and their habitats; and evaluating those risks to make siting, construction, and operation decisions. During the pre-construction tiers (Tiers 1, 2, and 3), developers are working to identify, avoid and minimize risks to species of concern. During post construction tiers (Tiers 4 and 5), developers are assessing whether actions taken in earlier tiers to avoid and minimize impacts are successfully achieving the goals and, when necessary, taking additional steps to compensate for impacts. Subsequent tiers refine and build upon issues raised and efforts undertaken in previous tiers. Each tier offers a set of questions to help the developer evaluate the potential risk associated with developing a project at the given location. Briefly, the tiers address:
  - Tier 1 – Preliminary site evaluation (landscape-scale screening of possible project sites)
  - Tier 2 – Site characterization (broad characterization of one or more potential project sites)
  - Tier 3 – Field studies to document site wildlife and habitat and predict project impacts
  - Tier 4 – Post-construction studies to estimate impacts
  - Tier 5 – Other post construction studies and research

  The tiered approach provides the opportunity for evaluation and decision-making at each stage, enabling a developer to abandon or proceed with project development, or to collect additional information if required. This approach does not require that every tier, or every element within each tier, be implemented for every project. The Service anticipates that many distributed or community facilities will not need to follow the Guidelines beyond Tiers 1 and 2. Instead, the tiered approach allows efficient use of developer and wildlife agency resources with increasing levels of effort.

- **Management of Land Boundary Plans – BLM**
  Source: BLM
  Description: Provides information about the BLM cadastral survey program, it support of BLM programs. The cadastral survey program assists federal, tribal, and Alaska Native land management agencies by interpreting and analyzing survey plats, locating boundary markers in the field, and performing new and retracement cadastral surveys when necessary evidence can be done by the standards for boundary evidence certifi cate process, instead of having a full survey. Other services involve surveys to assist in: the resolution of trespass upon public lands, defining the boundaries of timber sales, rights-of-way, leasing lands to local communities under the Recreation and Public Purposes Act, identifying boundaries of lands to be exchanged and other services.
  Online at:
  http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS__REALTY__AND_RESOURCE_PROTECTION_/lands_and_realty.Par.31679.File.dat/Mgmt%20of%20Land%20Boundaries.pdf

- **Mitigation Guidelines, South Dakota Field Office**

  Source: BLM, SDFO
  Reference: SD RMP and EIS. See Appendix C for full details.
  Online at: http://blm.gov/m1kd. Refer to Appendix C
  Developed/Updated:
  Activities Affected: Surface disturbing activities
  Description: South Dakota Field Office (SDFO) Mitigation Guidelines are a compilation of practices employed by the Bureau of Land Management (BLM) to mitigate impacts from surface disturbance. They apply to activities such as road or pipeline construction, range improvements, and permitted recreation activities. These guidelines are designed primarily to address soil and water concerns but they also address air, vegetation, wildlife habitat, and cultural or historic properties.

  The guidelines are presented as an appendix of the Resource Management Plan (RMP) for easy reference, as they apply to many resources and derive from many laws. This list included in the appendix is not comprehensive and is intended to be used as a guide for appropriate project planning, design, and implementation within the SDFO. Because mitigation measures change or are modified, based on new information, the guidelines are updated periodically for SDFO.

  Specific conservation actions and mitigation measures for sage grouse management can be found in the mitigation section of the Chapter 2 summary and in Appendix V-1. In addition to the practices described in this Appendix, Appendix B provides Best Management Practices, Guidelines and Standard Operating Procedures to avoid or reduce the impacts of various actions or activities.

  The purpose of the SDFO Mitigation Guidelines is (1) to reserve, for BLM, the right to modify the operations of all surface and other human presence disturbance activities as part of the statutory requirements for environmental protection, and (2) to inform a potential lessee, permittee, or operator of the requirements that must be met when using BLM-administered public lands.

  Application of the mitigation guidelines to all surface and other human presence disturbance activities concerning BLM- administered public lands and resources will also provide more uniformity in mitigation than has occurred in the past. These guidelines are primarily intended for the purpose of consistency in the ways requirements are determined for avoiding and mitigating environmental impacts and resource and land use conflicts. Consistency in this sense does not mean that identical requirements would be applied for all similar types of land use activities that may cause similar types of impacts. It also does not mean that the requirements or guidelines for a single land use activity would be identical in all areas. Individual measures may not be appropriate for every situation and would be analyzed on a case-by-case basis.

  Those resource activities or programs currently without a standardized set of permit or operation stipulations can use the mitigation guidelines as stipulations or as conditions of approval, or as a baseline for developing specific stipulations for a given activity or program.

  Mitigation employs measures that have been developed to reduce environmental impacts associated with certain types of activities. Best Management Practices (BMPs) are mitigation measures designed to reduce undesirable impacts to the environment. Incorporation of mitigation can typically result in a more efficient environmental review process, increased operating efficiency, reduced reclamation, and less environmental impacts (The Gold Book, 2007).

  Objectives:
  - Use avoidance or relocation as the preferred strategy for reducing potential adverse effects.
  - Employ as much mitigation as possible during planning.
  - Minimize surface disturbance effects of operations and maintain the reclamation potential of the site through design, construction, and other practices/techniques.
  - Reduce impacts to soil and water resources. Eliminate sources of ground water and surface water contamination.
  - Manage Invasive Species

- Reduce impacts to air resources
- Develop and implement a mitigation monitoring and reporting strategy

Guidelines for installation of culverts and waterbody crossings are included to address erosion, scour, seepage, impedance of flow, fish passage and blockage of drainages.

- **Monitoring Guidelines for Soils**
  Source: BLM
  Reference: RMP and EIS, Appendix N
  Online at: http://blm.gov/m1kd. Refer to Appendix N
  Developed/Updated: 2009
  Activities Affected: Surface disturbing activities, reclamation, soils and vegetation.
  Description: Provides monitoring direction and monitoring criteria for soils. Considers erosion, streambanks, floodplains, riparian areas, soil salinization, sodification, compaction, rutting, productivity, fill material and subsidence. Lists techniques, unit of measures, frequency and duration of monitoring, remedial action triggers, and management option.

- **National Management Measures to Control Nonpoint Source Pollution from Agriculture**
  Source: EPA
  Reference: EPA 841-B-03-004
  Online at: http://water.epa.gov/polwaste/nps/agriculture/agmm_index.cfm
  Developed/Updated: 2003
  Activities Affected: Wide variety of activities including livestock grazing
  Description: A technical guidance and reference document for use by State, local, and tribal managers in the implementation of nonpoint source pollution management programs. It contains information on the best available, economically achievable means of reducing pollution of surface and ground water from agriculture. Note that Chapter 4e specifically relates to grazing management.

- **National Range and Pasture Handbook**
  Source: NRCS
  Reference: 190vi-NRPH
  Online at: http://directives.sc.egov.usda.gov/viewerFS.aspx?hid=18937
  Developed/Updated: 2003
  Activities Affected: Livestock grazing, soil, vegetation and water quality.
  Description: The National Range and Pasture Handbook provide procedures in support of NRCS policy for the inventory, analysis, treatment, and management of grazing land resources. Revision 1 of the handbook contains revisions to incorporate current concepts and format for developing rangeland ecological site descriptions and forage suitability group descriptions. Information was added regarding the effects of vegetation, grazing, and management on rangeland and pastureland hydrology and erosion.

- **Reclamation Guidelines, South Dakota**
  Source: BLM, SDFO
  Reference: SD RMP and EIS. Refer to Appendix D.
  Online at: http://blm.gov/m1kd . Refer to Appendix D for full details.
  Developed/Updated:
  Activities Affected: Surface disturbing activities, reclamation, minerals
  Description: Reclamation would be required for surface disturbing activities (BLM surface only) that disturb vegetation and/or mineral/soil resources. The reclamation of a site aims to set the perpetual course for the planned future condition of a site, including eventual ecosystem restoration by natural processes. Prior to a surface disturbing activity the site would be evaluated on a case-by-case basis, including an on-site assessment if necessary, and mitigation measures would be enacted where appropriate. Reclamation plans would be site-specific, project-specific, and incorporate the project's complexity, environmental concerns, and reclamation potential. This appendix gives guidance for appropriate reclamation planning prior to authorization and following surface disturbance.

  These reclamation guidelines apply to all surface disturbing activities, including BLM initiated activities, and

must be addressed in each reclamation plan. These guidelines must be met prior to release of the bond and/or reclamation liability. Where these reclamation guidelines differ from more stringent, applicable, laws, rules, and regulations, those standards replace this policy.

Objectives include:
- Manage all waste materials
- Ensure subsurface integrity and eliminate sources of ground and surface water contamination
- Re-establish slope stability, surface stability, and desired topographic diversity.
- Reconstruct and stabilize water courses and drainage features.
- Maintain the biological, chemical, and physical integrity of the soil resource.
- Prepare site for revegetation.
- Establish a desired, self-perpetuating, native plant community.
- Re-establish complementary visual composition.
- Manage Invasive Species
- Develop and implement a reclamation monitoring and reporting strategy.

- **Renewable Energy Facilities on BLM-Administered Lands: Best Management Practices for Reducing Visual Impact**

  Source: BLM
  Reference: BLM/WY/PL-13/013+1340
  Online at: http://www.blm.gov/wo/st/en/prog/energy/renewable_energy.html
  Developed/Updated: 2013
  Activities Affected: Renewable energy, including wind, solar, and geothermal
  Description: This BMP presents information about the visual characteristics of renewable energy facilities and BMPs for avoiding or reducing visual impacts from the facilities. It presents the visual characteristics and BMPs for wind energy facilities, solar energy facilities, and geothermal facilities. It also provides BMPs for "common elements," which include ancillary facilities common to utility-scale energy facilities as well as the design, construction, operation, and decommissioning activities common to large-scale energy development projects. The common element BMPs presented ancillary facilities include BMPs for electric transmission systems, roads and other surfaces, structures, and signs. The common element BMPs for design, construction, operation, and decommissioning activities include the following:

  - Visual impact analysis and mitigation planning;
  - Facility siting and design;
  - Structure design and materials selection;
  - Materials surface treatments;
  - Lighting design and operation;
  - Avoiding unnecessary disturbance;
  - Soil management and erosion control;
  - Vegetation management;
  - Interim and long-term reclamation; and
  - "Good housekeeping" practices.

- **Riparian Area Management: Grazing Management Processes and Strategies for Riparian-Wetland Areas**
  Source: BLM
  Reference: Technical Reference 1737-20
  Online at: http://www.blm.gov/or/programs/nrst/files/Final%20TR%201737-20.pdf
  Developed/Updated: 2006
  Activities Affected: Livestock grazing, wildlife, riparian, vegetation and soils.
  Description: This technical reference provides the most current information to further assist livestock operators and land managers in developing successful riparian-wetland grazing management strategies across a wide array of land types. It is also the core document for the Grazing Management for Riparian-Wetlands training course. This technical reference does not set forth a specific formula for identifying the type of grazing strategy best suited for an area. Rather, it provides information to help design appropriate grazing strategies so that soil and vegetation aspects, water issues, and wildlife and livestock needs are addressed in a collaborative manner.

- **Selected Practices for Avian Protection on Power Lines**
  Source: Avian Power Line Interaction Committee
  Online at: http://www.aplic.org
  Developed/Updated: 2012
  Activities Affected: Power line ROWs and wildlife.
  Description: Provides practices and guidelines to limit power line hazards to birds. Provides engineers, biologists, utility planners and the public with a comprehensive resource for eliminating or reducing avian electrocutions and collisions, and highlights management options and cooperative partnerships.

- **Siting Guidelines for Wind Power Projects in South Dakota**
  Source: The South Dakota Bat Working Group in cooperation with the South Dakota Department of Game, Fish and Parks.
  Online at: http://gfp.sd.gov/wildlife/docs/wind-power-siting-guidelines.pdf
  Developed/Updated:
  Activities Affected: Renewable energy and wildlife.
  Description: Siting guidelines for wind power developers and other stakeholders to utilize as they consider potential wind power sites in South Dakota. These guidelines address issues/concerns associated with the preconstruction, construction or post-construction of wind turbines and have been divided into eleven general categories:
  - Natural and Biological Resources
  - Noise
  - Visual Resources
  - Public Interaction
  - Soil Erosion and/or Water Quality
  - Health and Safety
  - Cultural, Archaeological, and Paleontological Resources
  - Socioeconomic, Public Services, and Infrastructure
  - Solid and Hazardous Wastes
  - Air Quality and Climate

- **Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development**
  Source: BLM
  Reference: BLM/WO/ST-06/021+3071
  Online at: http://www.blm.gov/wo/st/en/prog/energy/oil_and_gas/best_management_practices/gold_book.html
  Developed/Updated: 2007
  Activities Affected: Oil and Gas and resources impacted by oil and gas development.
  Description: BMPs for oil and gas demonstrate practical ideas which may eliminate or minimize adverse impacts from oil and gas development to public health and the environment, landowners, and natural resources; enhance the value of natural and landowner resources; and reduce conflict.

- **Standards for Boundary Evidence - Cadastral Survey**
  Source: BLM
  Description: Details the Bureau's plan to ensure Cadastral Survey review of boundary evidence prior to the approval of significant land and resource transactions and commercial projects.
  http://www.blm.gov/wo/st/en/prog/more/cadastralsurvey/cadastral_review_of.html

- **Upland Soil Erosion Monitoring and Assessment: An Overview**
  Source: BLM
  Reference: Technical Note 438
  Online at: http://www.blm.gov/nstc/library/pdf/TN438.pdf
  Developed/Updated: 2011
  Activities Affected: Livestock grazing, soils, vegetation and reclamation
  Description: This technical note is intended to aid resource specialists in evaluating techniques for monitoring and assessing upland soil surface erosion, other than gully erosion. A brief discussion of erosion processes is incorporated in this document. Highlighted monitoring techniques include visual indicators of erosion, watershed cover, remote sensing cover, silt fence catchments, erosion bridge, erosion plots, close-range

photogrammetry, and cesium-137. An overview, brief discussion on procedure, advantages and disadvantages, and data analysis considerations are summarized for each monitoring technique.

- **Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States**
  Source: BLM
  Reference: *ROD* 11-29-2007
  Online at: http://www.blm.gov/wo/st/en/prog/more/veg_eis.html
  Developed/Updated: 2007
  Activities Affected: Weeds, reclamation
  Description: This document outlines the specific decisions, standard operating procedures, and mitigation measures based on the Final Programmatic EIS concerning the use of herbicides in the Bureau of Land Management integrated pest management program.

- **Wind Energy Development Programmatic EIS**
  Source: BLM
  Reference: FEIS Chapter 2 (Section 2.2.3.2)
  Online at: http://windeis.anl.gov
  Developed/Updated: 2010
  Activities Affected: Renewable energy and resources impacts by development of wind energy.
  Description: As part of the proposed action, BLM developed BMPs for each major step of the wind energy development process, including site monitoring and testing, plan of development preparation, construction, operation, and decommissioning. General BMPs are available for each step, and certain steps also include specific BMPs to address the following resource issues: wildlife and other ecological resources, visual resources, roads, transportation, noise, noxious weeds and pesticides, cultural/historic resources, paleontological resources, hazardous materials and waste management, storm water, human health and safety, monitoring program, air emissions and excavation and blasting activities.

  ***Note*:** Although the Wind Energy Development Programmatic EIS addressed only the 11 western states and did not include South Dakota, the BMPs, Guidelines and Standard Operating Procedures described in this EIS may be utilized as projects are proposed and implemented.